

Mountain Plover

Species Conservation Assessment Update

Title of Assessment: Mountain Plover (*Charadrius montanus*): A Technical Conservation Assessment, USDA Forest Service, Rocky Mountain Region

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Update Summary

Distribution: Collectively, the Sources listed herein suggest no substantial change to mountain plover range since the Technical Species Conservation Assessment was published. The species still occupies most areas assumed to be occupied in 2003, and it has not colonized new areas to any notable degree. However, there are significant increases to rangewide estimates of mountain plover abundance (see Sources 21, 22, 23, 28, and 32).

Taxonomic Status: The taxonomic status of mountain plovers has remained essentially unchanged. There is apparently very little genetic subdivision of the global population (Source 19). Analysis of the isotopic composition of feathers has great potential for elucidating the connections between specific winter ranges and breeding grounds (Source 31), which won't change species taxonomy, but could have management implications at the population level.

Agency Status: Mountain plovers have been designated as conservation priorities in the Comprehensive Wildlife Conservation Strategies of 4 of the 5 states in Region 2 (Sources 5, 25, 33, and 34); the exception being South Dakota, where breeding mountain plovers are considered absent. This should focus more conservation and management attention on the species. Protection via the U.S. Endangered Species Act has been rejected for both black-tailed and white-tailed prairie dogs (Sources 10 and 11); given commonalities of their range and habitat with mountain plover such protection would have afforded additional protection for mountain plovers.

Other: There is increasing advocacy for using more complex and accurate techniques of estimating distribution, abundance (Source 9), and nest success (Sources 14, 24, and 27) for birds in general, and mountain plovers in particular. These newer techniques can better inform management and monitoring programs.

There is continued interest in grassland birds as conservation priorities (Sources 3, 12, and 20), and many new management and/ or conservation plans center on grassland birds (Sources 3, 4, 5, 7, 16, 25, 33, 34, and 35).

Significance of Changes Relative to Original Assessment: Recent research and management documents have substantially changed the knowledge base, management context, and conservation context for mountain plover throughout its range and in USDA Forest Service Region 2. Two of the most prominent mountain plover experts in the region - F. Knopf and M. Wunder - consider the information developed over the past 3 years to have significantly increased our understanding of the species. These 2 experts have collaborated on a new "Birds of North America" account of mountain plover, which is slated for release very soon and could serve as an efficient platform on which to base an updated Species Conservation Assessment (Source 36).

Positive Findings of New or Updated Information and Their Sources

(Note: The Table A checklist attached to this update provides a summary of all sources consulted)

Source 1

Alberta Sustainable Resource Development. 2003. Status of the mountain plover (*Charadrius montanus*) in Alberta. Alberta Sustainable Resource Development - Fish and Wildlife Division / Alberta Conservation Association. Alberta Wildlife Status Report No. 50. Edmonton, Alberta, Canada.

Summary of New Information

The maximum number of breeding pairs of mountain plovers in Alberta is ≤ 6 ; all of Canada probably supports <10 breeding pairs total. This report essentially reaffirms the very minor role that Canadian prairies play in mountain plover management and conservation.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance

Source 2

Beauvais, G.P. and R. Smith. 2003. Model of breeding habitat of the mountain plover (*Charadrius montanus*) in western Wyoming. Western North American Naturalist 63: 88-96.

Summary of New Information

This study modeled habitat use by mountain plovers in the shrub-steppe basins of southwestern Wyoming. Mountain plovers there strongly preferred the same general environments that they prefer in Great Plains grasslands; namely, flat areas with relatively short and sparse vegetation. A logistic regression model predicting mountain plover presence as a function of topographic slope and vegetation stature is presented. The map form of this model suggests a distribution in the state similar to that estimated by Source 34. The authors suggest that the factors producing low and sparse vegetation in western Wyoming (e.g., poor soil, low precipitation, persistent wind) are more stable in time and space than those producing similar vegetation in the Great Plains (e.g., episodic drought, mammal grazing, wildfire), and thus plover habitat in western Wyoming is also more stable. Also, the authors suggest that nesting plovers may prefer landscape positions such as ridge crests, rims, and plateau tops because such positions force aerial predators (raptors) to skyline themselves upon approach.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Habitat

Source 3

Brennan, L.A. and W.P. Kuvlesky, Jr. 2005. North American grassland birds: an unfolding conservation crisis? Journal of Wildlife Management 69:1–13.

Summary of New Information

This paper presents the broad case that grassland birds as a group have undergone, and will likely continue to experience, declines in abundance and distribution in North America as a result of a suite of interacting anthropogenic processes. This group's decline may become one of the most "prominent" wildlife conservation crises of the 21st century. Mountain plovers are mentioned only in passing. The authors suggest that the strategic actions proposed by the North American Bird Conservation Initiative have great potential to avert this crisis by coordinating conservation action across a range of organizations.

Relevant Sections of the Conservation Assessment Affected by the Updates

Management status

Source 4

Colorado Division of Wildlife. 2003. Alliance aims to conserve mountain plover. Colorado Department of Natural Resources/Division of Wildlife (November 2003).

Summary of New Information

An alliance of state, federal, and private groups, including more than a dozen landowners, are working to conserve the mountain plover in Colorado. The program involves, among other things, a telephone alerting system whereby landowners call biologists prior to working fields so that mountain plover nest surveys can take place. Discovered nests are flagged by biologists, and avoided by farmers and ranchers operating in their fields. See Source 7.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Management of the Mountain Plover in Region 2

Source 5

Colorado Division of Wildlife. 2005. Colorado's comprehensive wildlife conservation strategy. Colorado Division of Wildlife. Denver, Colorado, USA.

Summary of New Information

This document is the Comprehensive Wildlife Conservation Strategy for the state of Colorado, and is guided by the following principles: (1) encourage and support conservation actions that meet the needs of species of greatest conservation need; (2) manage for healthy key habitats and ecosystems so that all species of greatest conservation need will benefit; (3) create a strategy that will be flexible enough to incorporate new research findings and successful management innovations; (4) acknowledge the pivotal role that private landowners and local stakeholders play in conservation; (5) enhance, not replace, other planning efforts; and (6) maintain an atmosphere of cooperation among wildlife managers, landowners, private and public land managers, and other stakeholders. Mountain plovers (*Charadrius montanus*) are identified as one of Colorado's species of greatest conservation need, and as such are described in this plan as to their distribution, status, habitat use, threats, and likely responses to particular management actions. The grasslands of eastern Colorado (i.e., primary mountain plover range) are described as being in the poorest condition, and hence in most need of conservation attention, of all ecological systems in the state. This Source provides a long list of management recommendations for mountain plover, both in its own text and by Source to existing mountain plover-related management plans for the state of Colorado. This Source is probably best considered in the context of Sources 25, 33, and 34.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Threats, Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2

Source 6

Dinsmore, S.J., G.C. White, and F.L. Knopf. 2005. Mountain plover population responses to black-tailed prairie dogs in Montana. *Journal of Wildlife Management* 69: 1546–1553.

Summary of New Information

This study related population growth (λ) of mountain plovers to area occupied by black-tailed prairie dogs (*Cynomys ludovicianus*) using 4 years of data from a portion of Phillips County, Montana. Mountain plovers declined as prairie dogs declined (due to an outbreak of sylvatic plague), then increased as prairie dogs increased. The authors concluded that mountain plovers in this area are at least partially dependent on black-tailed prairie dogs, and thus the conservation and management of the former is affected by the conservation and management of the latter.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Community Ecology, Threats, Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2

Source 7

Dreitz, V.J. 2005. Resolving conflicts of mountain plovers (*Charadrius montanus*) breeding on agricultural lands in Colorado: final report. Colorado Natural Heritage Program - Colorado State University. Fort Collins, Colorado, USA.

Summary of New Information

This investigation addressed one major factor that may be driving mountain plover population declines in eastern Colorado: cultivation practices on private lands. Three-hundred ninety-five mountain plover nests, located in rangeland and cropland, were identified and studied between 2001-2003. Nest success was similar between rangeland and cropland. However, nest failure on croplands was primarily due to soil-compacting activities associated with agriculture. Locating and flagging cropland nests prior to soil-compacting activities may allow agricultural workers to avoid destroying the nests, and lead to greater mountain plover reproductive output. See Source 4.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Habitat, Breeding Biology, Management of the Mountain Plover in Region 2

Source 8

Dreitz, V.J., M.B. Wunder, and F.L. Knopf. 2005. Movements and home ranges of mountain plovers raising broods in three Colorado landscapes. *Wilson Bulletin* 117:128-132.

Summary of New Information

Breeding mountain plovers were studied in 3 habitat types - rangeland, agricultural fields, and black-tailed prairie dog (*Cynomys ludovicianus*) towns - in eastern Colorado. Home range sizes (95% fixed kernel) were similar between all 3 types and were consistent with home range sizes reported previously in the literature. Additionally, the movement distances of individual mountain plovers were equivalent between all 3 habitats. Breeding mountain plovers were observed moving between individual prairie dog towns within a complex of towns, suggesting that complexes of small towns, in addition to single larger towns, should be considered as high quality mountain plover habitat.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Habitat, Breeding Biology, Community Ecology, Management of the Mountain Plover in Region 2

Source 9

Dreitz, V.J., P.M. Lukacs, and F.L. Knopf. 2006. Monitoring low density avian populations: an example using mountain plovers. *Condor* 108:700-706.

Summary of New Information

The authors used the detection/ nondetection analytical technique of Royle and Nichols (Ecology [2003] 84:777-790) to estimate abundance of breeding mountain plovers in 3 habitats (agricultural fields, rangeland, and black-tailed prairie dog [*Cynomys ludovicianus*] towns) in eastern Colorado. The technique was judged to be both practical and effective, and estimated mountain plovers to be most abundant in prairie dog towns, slightly less abundant in agricultural fields, and much less

abundant in rangeland. Detection/ nondetection models have great promise for accurate monitoring of mountain plover populations.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Habitat, Community Ecology, Management of the Mountain Plover in Region 2, Information Needs

Source 10

Federal Register. 2004a. Endangered and Threatened Wildlife and Plants; Finding for the Resubmitted Petition To List the Black-Tailed Prairie Dog as Threatened. Federal Register 69: 51217-51226.

Summary of New Information

Based on recent data that suggests the threats to black-tailed prairie dogs (*Cynomys ludovicianus*) are not as severe as previously assumed, the USDI Fish and Wildlife Service decided to not list the species as Threatened under the U.S. Endangered Species Act. Such a listing would have had significant management implications for mountain plovers given the positive association between the 2 species, as documented in the Species Conservation Assessment and numerous references detailed in his update. Current estimates suggest about 1,842,000 acres are occupied by black-tailed prairie dogs in the U.S., with about 1,430,000 acres (78%) encompassed by the 5 states of USDA Forest Service Region 2. Mortality from infection by sylvatic plague was determined to be the most important rangewide threat to black-tailed prairie dogs, followed by deliberate poisoning.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2

Source 11

Federal Register. 2004b. Endangered and threatened wildlife and plants; 90-day finding on a petition to list the white-tailed prairie dog as Threatened or Endangered. Federal Register 69: 64889-64901.

Summary of New Information

Based on recent data that suggests the threats to white-tailed prairie dogs (*Cynomys leucurus*) are not as severe as previously assumed, the USDI Fish and Wildlife Service determined to not list the species as Threatened or Endangered under the U.S. Endangered Species Act. Such a listing may have had significant management implications for mountain plovers in the western portion of their range, assuming that mountain plovers associate with white-tailed prairie dogs in a similar fashion as they associate with black-tailed prairie dogs (*C. ludovicianus*). Major sources of white-tailed prairie dog mortality are the same as those for black-tailed prairie dogs: namely, infection by sylvatic plague, deliberate poisoning, and shooting. Habitat degradation by oil and gas development is another possible impact, but has not yet been demonstrated conclusively.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2

Source 12

Guo, X., J. Wilmschurst, S. McCanny, P. Fargey., and P. Richard. 2004. Measuring spatial and vertical heterogeneity of grasslands using remote sensing techniques. Journal of Environmental Informatics 2004:24-32.

Summary of New Information

Analyses of Landsat imagery successfully detected vertical and horizontal heterogeneity in Canadian grasslands. Grasslands under conservation action had greater and more variable canopy heights than those subject to livestock grazing; grazed grasslands had more horizontal variability than conserved grasslands. The analytical techniques used in this study mapped grassland structure reliably at 15m resolution. Such remote sensing work could be extremely valuable in mapping mountain plover habitat across large areas.

Relevant Sections of the Conservation Assessment Affected by the Updates

Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2, Information Needs

Source 13

Hamer, T.L., C.H. Flather, and B.R. Noon. 2006. Factors associated with grassland bird species richness: the relative roles of grassland area, landscape structure, and prey. *Landscape Ecology* 21: 569–583.

Summary of New Information

The species richness of grassland birds in eastern Wyoming was positively associated with area of grassland habitat; negatively associated with habitat dispersion; positively associated with edge habitats; negatively associated with landscape matrix attributes that may restrict movement of grassland birds; and positively related to grasshopper species richness. This suggests that grassland birds in general are influenced by a complex suite of habitat and prey factors. This Source is tangentially relevant to mountain plovers.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Habitat, Community Ecology

Source 14

Lukacs, P.M., V.J. Drietz, F.L. Knopf, and K.P. Burnham. Estimating survival probabilities of unmarked dependent young when detection is imperfect. *Condor* 106:926-931.

Summary of New Information

A capture-recapture analytical approach was used to estimate the survival probability of mountain plover chicks. If the attending adult is marked, the nest is found prior to hatching, and number of hatched eggs is known, subsequent data on the number of chicks observed with the marked adult can be used to successfully estimate chick survival. This method can be used for a variety of bird species.

Relevant Sections of the Conservation Assessment Affected by the Updates

Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2, Information Needs

Source 15

Mettenbrink, C.W., V.J. Drietz, and F.L. Knopf. 2006. Nest success of mountain plovers relative to anthropogenic edges in eastern Colorado. *Southwestern Naturalist* 51:191-196.

Summary of New Information

From 2003-2004 163 mountain plover nests were monitored in eastern Colorado; 81 nests successfully hatched at least 1 egg, and 82 hatched no eggs. Based on logistic regression modeling, successful nests were neither closer nor farther from anthropogenic edges (fence lines, roads, perimeter of crop fields) than unsuccessful nests. Nest success of mountain plovers in this landscape appears to be independent of distance-to-edge.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Habitat

Source 16

Neely, B. S. Kettler, J. Horsman, C. Pague, R. Rondeau, P. Comer, L. Grunau, G. Belew, F. Pusateri, B. Rosenlund, D. Runner, J. Sovell, D. Anderson, T. Jackson and M. Klavetter. 2006. Central Shortgrass Prairie ecoregional assessment and partnership initiative. The Nature Conservancy / Department of Defense Legacy Resource Management Program / Colorado Division of Wildlife.

Summary of New Information

This project identified a suite of sites in the Central Shortgrass Prairie Ecoregion (extreme southeastern Wyoming, southwestern Nebraska, eastern Colorado, western Kansas, Oklahoma panhandle, and extreme northern Texas panhandle) that, if placed under conservation action, would efficiently conserve most of the biological diversity present in that ecoregion. Mountain plovers were selected as a conservation target to explicitly inform this effort, and the plan includes a map of estimated mountain plover density (an interpolated density surface) based on documented sightings of the species throughout the ecoregion.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Conservation Status of the Mountain Plover in Region 2, Management of the Mountain Plover in Region 2

Source 17

Obele, K.A. 2005. A vegetative characterization of mountain plover nest sites on the Pawnee National Grassland : a management perspective. MS Thesis, Colorado State University. Ft. Collins, Colorado, USA.

Summary of New Information

This Source was not directly reviewed given the difficulty of its acquisition. Internet-based literature search engines failed to uncover any publications attributable to this author; it may be that publications derived from this thesis are in-preparation or in-press at this time.

Relevant Sections of the Conservation Assessment Affected by the Updates

NA

Source 18

Oring, L.W., L. Neel, and K.E. Oring. 2006. Intermountain west regional shorebird plan: version 1.0.

Summary of New Information

The goals of this plan are to: (1) facilitate protection, restoration, and management of shorebird habitat in the Intermountain West region (IMW); (2) acquire and organize existing information on shorebird distribution and abundance needed for conservation in the IMW; (3) gather new information needed for shorebird conservation in the IMW; (4) develop an informed and supportive constituency for long-term shorebird conservation in the IMW; and (5) achieve regional cooperation for shorebird conservation by developing a process to facilitate planning among states and agencies, and working toward integration of shorebird concerns with land management plans. This plan recognizes that the IMW supports small but important breeding concentrations of mountain plovers; more importantly, virtually all mountain plover winter range falls in this region.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies

Source 19

Oyler-McCance, S., J. St. John, F.L. Knopf, and T.W. Quinn. 2005. Population genetic analysis of mountain plover using mitochondrial DNA sequence data. *Condor* 107:353-362.

Summary of New Information

Mitochondrial DNA analysis suggests that the current population of mountain plovers is not differentiated into distinct genetic subunits. This contrasts with the pattern expected for a long-distance migrant with high site fidelity. It is hypothesized that the observed genetic homogenization might result from pair bond formation in mixed flocks on wintering grounds. The molecular analysis also suggests that mountain plovers expanded their range rapidly following the Pleistocene/ Holocene transition.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Site fidelity, Breeding Biology

Source 20

Peterson, A.T. 2003. Subtle recent distributional shifts in Great Plains bird species. *Southwestern Naturalist* 48:289-292.

Summary of New Information

Data from the Breeding Bird Survey suggests that 5 species of bird endemic to the Great Plains, including mountain plover, have collectively shifted their range northward in recent decades. The shift was not as significant for the mountain plover as it was for other species, or for the collective group of 5 species. It is suggested that global climate change may be driving these subtle but significant range shifts.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance

Source 21

Plumb, R.E., S.H. Anderson, and F.L. Knopf. 2005. Habitat and nesting biology of mountain plovers in Wyoming. *Western North American Naturalist* 65:223-228

Summary of New Information

Fifty-five mountain plover nests were studied in grassland and desert shrub throughout Wyoming in 2002-2003. Mean hatch date was estimated at 26 June (2002) and 21 June (2003). Eggs in 64% of known-fate nests hatched. Almost all nests occurred in the presence of ungulate grazers; prairie dogs were absent at 64% of nest sites. Nests were typically placed on flat and barren sites, consistent with existing descriptions of habitat use. Compared to random sites, nest sites had less dense and shorter grass. Over 50% of nests were placed on elevated plateaus. It is assumed that this Source is one major publication arising from Source 23; see also Source 22.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Habitat, Breeding Biology

Source 22

Plumb, R.E., F.L. Knopf, and S.H. Anderson. 2005. Minimum population size of mountain plovers breeding in Wyoming. *Wilson Bulletin* 117:15-22.

Summary of New Information

Data from a statewide survey of mountain plovers was analyzed with distance-sampling methods, and extrapolated using observed home range sizes, to estimate the number of breeding individuals in the state of Wyoming. The minimum estimated population of 3,393 individuals is a substantial increase over previous estimates of only 500 - 1,500 individuals. This new number indicates that Wyoming supports 24 - 31% of the global population of mountain plovers. It is assumed that this Source is one major publication arising from Source 23; see also Source 21.

Relevant Sections of the Conservation Assessment Affected by the Updates

Management Status, Biology and Ecology, Distribution and abundance, Population trend, Conservation Status of the Mountain Plovers in Region 2

Source 23

Plumb, R. 2004. Minimum population size and concentration areas of mountain plovers breeding in Wyoming. MS Thesis. University of Wyoming, Laramie, Wyoming, USA.

Summary of New Information

See Sources 21 and 22 for presumed publications of the major findings in this Source. Chapter 4 of this Source summarizes these findings, and forwards 5 recommendations for future management of mountain plovers: (1) livestock grazing is effective at maintaining breeding habitat; (2) other range management practices will affect mountain plover breeding habitat, most notably fire (habitat improvement) and exotic plant introduction (habitat degradation); (3) population trends may be tracked through annual monitoring of concentration areas; (4) effects of industrial (i.e., petroleum) development on mountain plovers is currently unclear, and should be a top research priority; and (5) the association between mountain plovers and prairie dogs (*Cynomys* spp.) may not be as strong as previously assumed.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Population trend, Habitat, Breeding Biology, Threats, Conservation Status of the Mountain Plovers in Region 2, Management of the Mountain Plover in Region 2, Information Needs

Source 24

Rotella, J.J., Dinsmore, S.J. & Shaffer, T.L. 2004. Modeling nest-survival data: a comparison of recently developed methods that can be implemented in MARK and SAS. *Animal Biodiversity and Conservation* 27:187-205.

Summary of New Information

Given recent advances in statistical theory and software, the authors suggest that more complex and accurate methods of estimating nest success should become the norm, and previous coarser methods are no longer justifiable. This source outlines the fine-points of some of the more complex models, using an example data set for mountain plovers. It is notable that the suggested methods include information theoretic techniques, which are seeing increased use in most areas of ecology. See Source 27.

Relevant Sections of the Conservation Assessment Affected by the Updates

Information Needs

Source 25

Schneider, R., M. Humpert, K. Stoner, and G. Steinauer. 2005. The Nebraska natural legacy project: a comprehensive wildlife conservation strategy. Nebraska Game and Parks Commission. Lincoln, Nebraska, USA.

Summary of New Information

This document is the Comprehensive Wildlife Conservation Strategy for the state of Nebraska, and has as its major goals (1) reversing the decline of at-risk species (and avoiding the need for state or federal listing as threatened or endangered), (2) recovering currently listed species and allowing for their de-listing, and (3) keeping now-common species common in the future. Mountain plovers are identified as a “Tier 1 At-Risk” species for Nebraska, and as such are described in this plan as to their distribution, status, habitat use, threats, and likely responses to particular management actions. Suitable habitat is generally described as short- or mixed-grass prairie in the western 1/3 of the state. This Source provides a long list of habitat management recommendations for mountain plover, and is probably best considered in the context of Sources 5, 33, and 34.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Threats, Conservation Status of Mountain Plover in Region 2, Management of Mountain Plover in Region 2

Source 26

Schneider, S.C., M.B. Wunder, and F.L. Knopf. 2006. Relationship between shrubs and foods in mountain plover habitat in Park County, Colorado. *Southwestern Naturalist* 51:197-202.

Summary of New Information

distance to nearest shrub, arthropod biomass, and grasshopper density to the probability of presence of mountain plovers with broods, and without broods, in South Park, Colorado. Results were complex and indicated that brood-rearing adults select habitat features differently than do non brood-rearing adults. Availability of invertebrate forage, and predator avoidance by chicks, appeared to be the driving factors: adults without broods positioned themselves in sites of high invertebrate abundance, and adults with broods positioned themselves relatively close to shrubs in similar sites (it was assumed that shrub proximity equated to cover from predators). The authors speculate that habitat edges (e.g., grassland/ shrubland, cropland/ rangeland, prairie dog town/ non-prairie dog town) may be important to breeding mountain plovers in that they can provide both high invertebrate abundance and vegetative cover.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Habitat

Source 27

Shaffer, T.L. 2004. A unified approach to analyzing nest success. *Auk* 121:526-540.

Summary of New Information

Similar to Source 24, this source suggests that field workers use more complex and accurate statistical methods to estimate nest success of birds, including mountain plovers. A “logistic exposure” approach is outlined, and examples are given using mountain plover field data. It is notable that the suggested methods include information theoretic techniques, which are seeing increased use in most areas of ecology.

Relevant Sections of the Conservation Assessment Affected by the Updates

Information Needs

Source 28

Shuford, W.D., N. Warnock, and R.L. McKernan. 2004. Patterns of shorebird use of the Salton Sea and adjacent Imperial Valley, California. *Studies in Avian Biology* 27:61–77.

Summary of New Information

Shorebird surveys performed in 1999 revealed that 2486 - 3758 individual mountain plovers (30-38% of the global population) winter on agricultural fields near the Salton Sea, California.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Habitat

Source 29

Smith, G.A., and M.V. Lomolino. 2004. Black-tailed prairie dogs and the structure of avian communities on the shortgrass plains. *Oecologia* 138:592–602.

Summary of New Information

Avian communities were studied on 36 black-tailed prairie dog (*Cynomys ludovicianus*) towns and 36 paired (i.e., no prairie dog towns) sites in the Oklahoma panhandle from 1997-1999. In general, prairie dog towns supported more individuals and more species of bird than did paired sites; prairie dog towns also supported a unique assemblage of bird species as compared to the paired sites. Even in their current “remnant” state, black-tailed prairie dog towns appear to significantly structure bird communities in the Great Plains. Importantly, it appears that mountain plovers were not observed with enough frequency during this study for any specific conclusions to be made; thus, this study is only tangentially relevant to mountain plovers.

Relevant Sections of the Conservation Assessment Affected by the Updates

Community ecology

Source 30

Strickland, D. 2004. Overview of non-collision related impacts from wind projects. Wind Energy and Birds/ Bats Workshop Proceedings, 2004.

Summary of New Information

The author reports a decline in mountain plover numbers during and following the construction of wind power turbines in southern Wyoming. However, this decline was paralleled by similar declines in mountain plovers on nearby sites that were not affected by the turbine project. The main relevance of this source to the Species Conservation Assessment may be to alert readers to an apparent lack of information on the effects of wind power projects (forecasted to increase in the near future) on mountain plovers.

Relevant Sections of the Conservation Assessment Affected by the Updates

Information Needs

Source 31

Wunder, M.B., C.L. Kester, F.L. Knopf, R.O. Rye. 2005. A test of geographic assignment using isotope tracers in feathers of known origin. *Oecologia* 144:607-617.

Summary of New Information

Feathers were collected from 194 mountain plovers from across the species’ range, and feather isotopic signatures were analyzed in an attempt to correctly identify place of origin. Whereas traditional regression approaches did not accurately assign feathers to place of origin, discrete-response Bayesian probability models did. Correct assignment rates were highest when 3 isotopes were analyzed simultaneously, but even the use of a single isotope produced higher assignment rates than random assignment. This technique shows great promise for linking mountain plover breeding ranges to winter ranges.

Relevant Sections of the Conservation Assessment Affected by the Updates

Information Needs

Source 32

Wunder, M.B., F.L. Knopf, and C.A. Pague. 2003. The high-elevation population of mountain plovers in Colorado. *Condor* 105:654-662.

Summary of New Information

The population of mountain plovers in South Park, Colorado, was carefully surveyed and analyzed to estimate the total number of birds using the area during the breeding season. A map of potential habitat was created, and areas of known occupation were overlain on that map. Breeding densities were then estimated in occupied areas using distance sampling techniques. Estimated densities of 7.9 birds/ km² were high compared to other extant subpopulations of mountain plovers. Extrapolations of density estimates to all occupied habitat in South Park suggested a total of 2310 mountain plovers in South Park, which translates to about 16 - 21% of the most recent global population estimates.

Relevant Sections of the Conservation Assessment Affected by the Updates

Biology and Ecology, Distribution and abundance, Conservation status of the mountain plover in Region 2, Management of the mountain plover in Region 2

Source 33

Wasson, T., L. Yasui, K. Brunson, S. Amend, and V. Ebert. 2005. A future for Kansas wildlife: Kansas' comprehensive wildlife conservation strategy. Dynamic Solutions Inc. in cooperation with Kansas Department of Wildlife and Parks. Topeka, Kansas, USA.

Summary of New Information

This document is the Comprehensive Wildlife Conservation Strategy for the state of Kansas, and serves as a strategic plan that identifies broad priorities of species habitats, management and conservation issues, and, by inference, management and conservation strategies. Mountain plover is identified as a "Tier 1" priority species in Kansas, and as such is described in this plan as to its distribution, status, habitat use, threats, and likely responses to particular management actions. Suitable habitat is generally described as short- or mixed-grass prairie on flat or gently rolling topography, usually with abundant prairie dog or other ground squirrel colonies. This Source provides a long list of habitat and non-habitat management recommendations for mountain plover, and is probably best considered in the context of Sources 5, 25, and 34.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Threats, Conservation Status of the mountain plover in Region 2, Management of the mountain plover in Region 2

Source 34

Wyoming Game and Fish Department. 2005. A comprehensive wildlife conservation strategy for Wyoming. Wyoming Game and Fish Department. Cheyenne, Wyoming, USA.

Summary of New Information

This document is the Comprehensive Wildlife Conservation Strategy for the state of Wyoming. Its intent is to serve as a central "hub" for all existing and future management plans and conservation strategies in Wyoming, and to guide the combined efforts of government agencies at all levels, non-profits, academia, non-governmental organizations, tribes, and individuals to conserve all Wyoming wildlife. Mountain plover is identified as one of Wyoming's species of greatest conservation need, and as such is described in this plan as to its distribution, status, habitat

use, threats, and likely responses to particular management actions. The grasslands of eastern Wyoming (i.e., mountain plover range) are described as being the least intact, and hence in most need of conservation attention, of all ecological systems in the state. Mountain plovers are mapped as occurring in the grasslands of eastern Wyoming as well as the basins of central and western Wyoming, similar to the distribution mapped by Source 2. Suitable habitat is generally described as short- or mixed-grass prairie on flat or gently rolling topography, usually with abundant prairie dog or other ground squirrel colonies. This Source provides a long list of habitat and non-habitat management recommendations for mountain plover, and is probably best considered in the context of Sources 5, 25, and 33.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Threats, Conservation Status of the mountain plover in Region 2, Management of the mountain plover in Region 2

Source 35

Wyoming Game and Fish Department. 2006. Draft: a plan for bird and mammal species of greatest conservation need in eastern Wyoming grasslands. Wyoming Game and Fish Department. Cheyenne, Wyoming, USA.

Summary of New Information

This draft plan recognizes that grasslands are the most imperiled natural system in North America, and although Wyoming grasslands are in good condition relative to those in other states they also represent the least intact natural systems in Wyoming. Its goal is to formalize strategies that will help the Wyoming Game and Fish Department (WGFD) work cooperatively with landowners, other agencies and the public to conserve healthy grassland ecosystems in Wyoming, and enable the WGFD to address the conservation needs of Wyoming's grasslands and associated wildlife in a proactive manner. Mountain plover is recognized as a Wyoming grassland species-of-concern, and is described as to its distribution, status, habitat use, threats, and likely responses to particular management actions. However, most of this information appears very similar to that presented by Source 34. This Source may be best considered as an "extension" of Source 34.

Relevant Sections of the Conservation Assessment Affected by the Updates

Existing Regulatory Mechanisms, Mgmt Plans, and Conservation Strategies, Biology and Ecology, Distribution and abundance, Population trend, Habitat, Threats, Conservation Status of the mountain plover in Region 2, Management of the mountain plover in Region 2

Source 36

Personal communications with individual biologists and land managers in Region 2 regarding mountain plover ecology, management, and conservation.

Doug Keinath (Lead Zoologist, Wyoming Natural Diversity Database - University of Wyoming; dkeinath@uwyo.edu; 307 766-3023). The Wyoming Natural Diversity Database is currently working with the Wyoming Game and Fish Department to compile a complete set of all known mountain plover sightings in the state. Preliminary indications are that there has been no substantial range expansion or contraction in the state relative to previous distribution maps for this species. This dataset will be available upon request.

John Sovell (Zoology Team Leader, Colorado Natural Heritage Program - Colorado State University; jsovell@lamar.colostate.edu; 970 492-6052). The extrapolated density surface map of mountain plovers outlined in Source 16 may be the most up-to-date information on distribution in the Central Shortgrass Prairie ecoregion.

Rick Schneider (Nebraska Natural Heritage Program; Rick.Schneider@ngpc.ne.gov). The Rocky Mountain Bird Observatory (RMBO) has been conducting mountain plover surveys in

western NE for the last four years, mostly on cropland but some on rangeland as well. RS is uncertain if they have documented any range extensions. Bart Bly (308-762-2372; bart.bly@rmbo.org) would be the primary contact for this data, but note also that the Nebraska Natural Heritage Program has a complete set of RMBO observations of mountain plover, too.

Doug Backlund (South Dakota Natural Heritage Program; Doug.Backlund@state.sd.us). There are still no confirmed records of mountain plovers breeding recently in South Dakota. One adult was documented in Conata Basin in summer 2004, but follow-up surveys in the area in 2005 failed to find any mountain plovers. The only other recent documentation of presence in South Dakota is a pair sighted in 1978, with no evidence of nesting (Lohoefer, R. and C.A. Ely. 1978. South Dakota Bird Notes 30:24-30). Breeding adults just across the state lines in both Montana and Wyoming suggest possible breeding in extreme peripheral South Dakota.

Bill Busby (Kansas Natural Heritage Program; wbusby@ku.edu). BB's general impression is that mountain plover distribution and abundance is stable in Kansas, with presence limited to the southwest corner of the state.

Victoria Drietz (Colorado Division of Wildlife; victoria.drietz@state.co.us). At least 2 research projects involving mountain plovers are in-progress in Colorado: (1) a comparison of recruitment rates, and (2) a MS Thesis (Colorado State University) comparing methods to estimate density and occupancy of grassland birds, with mountain plovers as one of the focal species.

Andy Chappell (USDA Forest Service Cimarron National Grassland; atchappell@fs.fed.us). Mountain plovers are occasionally seen on the Cimarron NG, usually after prescribed burns.

Dave Augustine (USDA Forest Service Comanche National Grassland; daugustine@fs.fed.us). Many mountain plovers breed on the Comanche NG, and prescribed burning has been very successful at promoting their use of the area. DA has continued the plover-oriented prescribed burning outlined by Svingen and Giesen (1999; Colorado Field Ornithologists 33:208-212) with good success, as documented by available yearly project reports. Main conclusions from these reports are:

1. Prescribed burning provides much nesting habitat; nest success on burns is about 50%.
2. Cattle should be used to graze post-burn greenup. Nest trampling is not a concern, and grazing maintains the low vegetation preferred by plovers.
3. Prairie dog colonies are very important nesting habitat, but they need to be >320 acres in size and >5 years in age to be optimal.
4. Use of burns by mountain plovers seems to be higher in landscapes with dryland wheat farms. Plover use of native prairie may be low in dry years because they are using failed wheat fields instead. Farming activity likely crushes a lot of nests in these fields.

Larry Gerard (USDI Bureau of Land Management Buffalo Field Office; larry_gerard@blm.gov). Mountain plovers have been documented in several black-tailed prairie dog towns as a result of monitoring and permitting of coal-bed methane developments.

Michael Wunder (Colorado State University; mbw@lamar.colostate.edu). The body of scientific information regarding mountain plovers, both rangewide and in Region 2, has increased substantially since the Species Conservation Assessment was published. A new "Birds of North America" species account (prepared by M. Wunder and F. Knopf) of mountain plovers is currently in-press.

Fritz Knopf (USGS; Fritz_Knopf@usgs.gov). The body of scientific information regarding mountain plovers, both rangewide and in Region 2, has increased substantially since the Species Conservation Assessment was published. A new "Birds of North America" species account (prepared by M. Wunder and F. Knopf) of mountain plovers is currently in-press.

Stephen J. Dinsmore (Iowa State University; cootjr@iastate.edu). No significant range expansions or contractions have been noted since the Species Conservation Assessment was published.

Sue Oberlie (USDI Bureau of Land Management Lander Field Office; sue_oberlie@blm.gov). The Lander Field Office has been conducting many localized mountain plover surveys in conjunction with oil and gas development projects, and has documented several breeding pairs. Most have been in areas of typical habitat, with a few in marginal/ atypical locations.

Mary Read (USDI Bureau of Land Management Rawlins Field Office; mary_read@blm.gov). The Rawlins Field Office has been conducting mountain plover surveys since about 2000 in conjunction with oil and gas development projects. They are also mapping mountain plover habitat across about 1.2 million acres slated for future oil and gas work. Much of this work is being documented, but completeness and availability of study results is hampered by work overloads.

Additional Unabstracted Sources – *pre*-Assessment

(citations pre-dating Assessment publication that were not referenced in it).

Colorado Division of Wildlife. 2003. Conservation plan for grassland species in Colorado. Colorado Division of Wildlife. Denver, Colorado, USA.

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Svingen, D. and K. Giesen. 1999. Mountain plover (*Charadrius montanus*) response to prescribed burns on the Comanche National Grassland. Journal of the Colorado Field Ornithologists 33: 208-212.

Additional Unabstracted Sources – *post*-Assessment

(citations post-dating Assessment publication that refer to the target genus but were determined by the reviewer to contain no information requiring an update of the original assessment)

Alberta Sustainable Resource Development. 2003. Status of the mountain plover (*Charadrius montanus*) in Alberta. Alberta Sustainable Resource Development - Fish and Wildlife Division / Alberta Conservation Association. Alberta Wildlife Status Report No. 50. Edmonton, Alberta, Canada.

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Checklist of Sources Consulted for Updates to the Bluehead Sucker Conservation Assessment

Guidelines for Producing Updates

Sources of information relevant to review of this Technical Conservation Assessment for updates include databases, experts, personal communications, published and unpublished literature. Positive results are discussed in detail in the Summary of Addendum to the Technical Conservation Assessment.

Internet Literature Searches: The minimal search for each update consists of Google Scholar, Federal Register, plus a minimum of three other available online literature databases. Search terms include at a minimum: species common name, genus, and recent synonyms. Other keywords will be used at the discretion of the updater (e.g., passerine, wetland, rodent). Searches will be constrained to the time beginning two years prior to publication of the Technical Conservation Assessment to the present.

Two attempts were made to contact experts and agency personnel.

Table A. Sources of information consulted for updates to the Species Conservation Assessment.

Source Category	Source/ Name	Date	Results
Announcement from R2 to all FS personnel (including species list)			No global announcement was made. See individual contacts below.
Internet based literature databases	Google	14-07-2006	Basic Google search was not performed due to abundance of irrelevant documents.
	Google Scholar	14-07-2006	Unconstrained search on “mountain plover” = 947 documents; same for “Charadrius montanus” = 506 documents. Search on “mountain plover” documents published b/t 2003 - present = 89 ; same for “Charadrius montanus” = 65 ; same for “mountain plovers” = 47 . <i>20 relevant publications extracted from latter 3 searches</i>
	Federal Register	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for volumes 2003 - present. <i>3 new relevant sources</i>
	University of Wyoming Library Catalog	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>1 new relevant source</i>
	Wildlife and Ecology Studies Worldwide	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>3 new relevant sources.</i>

Source Category	Source/ Name	Date	Results
	Scopus	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>0 new relevant sources</i>
	Web of Science	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>2 new relevant sources</i>
	Agricola	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>0 new relevant sources</i>
	Biological Abstracts	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>0 new relevant sources</i>
	WorldCat	14-07-2006	Search terms “mountain plover”, “mountain plovers”, “Charadrius montanus” for 2003 - present. <i>1 new relevant source</i>
NatureServe affiliate program databases and personnel	Wyoming Natural Diversity Database (D. Keinath; dkeinath@uwyo.edu)	14-07-2006	<i>DK response summarized and on file</i>
	Colorado Natural Heritage Program (J. Sovell; jsovell@lamar.colostate.edu)	8-08-2006	<i>JS response summarized and on file; provided 1 new source</i>

Table A. Sources of information consulted for updates to the Species Conservation Assessment.

Source Category	Source/ Name	Date	Results
	Nebraska Natural Heritage Program (R. Schnieder; Rick.Schneider@ngpc.ne.gov)	8-08-2006	<i>RS response summarized and on file; RS also forwarded message to many colleagues</i>
	South Dakota Natural Heritage Program (D. Backlund; Doug.Backlund@state.sd.us)	8-08-2006	<i>DB response summarized and on file</i>
	Kansas Natural Heritage Program (William Busby; wbusby@ku.edu)	8-08-2006	<i>BB response summarized and on file; provided 1 new source</i>
State Agency Personnel	Wyoming Game and Fish Department (A. Cerovski; Andrea.Cerovski@wgf.state.wy.us)	8-08-2006	AC forwarded email to Bryce Krueger, WGFD
	Wyoming Game and Fish Department (Bryce Krueger; Bryce.Krueger@wgf.state.wy.us)	21 August 2006	BK responded with no new information
	South Dakota Game Fish and Parks (D. Backlund - Doug.Backlund@state.sd.us)	8-08-2006	<i>DB response summarized and on file</i>
	John Dinan, NGPC Nongame Bird Biologist (jdinan@ngpc.state.ne.us)	8-08-2006	No response
	Colorado Division of Wildlife (Victoria Dreitz; victoria.dreitz@state.co.us)	8-08-2006	<i>VD response summarized and on file; provided 1 new source, and also forwarded the message to several colleagues</i>
	Colorado Division of Wildlife (Eric Odell; eric.odell@state.co.us)		EO responded with no new information, but forwarded the message to colleagues
	Kansas Department of Wildlife and Parks (Ken Brunson; kenb@wp.state.ks.us)	8-08-2006	No response
Federal Agency Personnel	USDA Forest Service Medicine Bow Routt NF/ TBNG (Tim Byer; tbyer@fs.fed.us)	8-08-2006	No response
	USDA Forest Service Buffalo Gap NG (Doug Sargent; dsargent@fs.fed.us)	8-08-2006	No response

Source Category	Source/ Name	Date	Results
	USDA Forest Service Black Hills NF (Cara Staab; cstaab@fs.fed.us)	8-08-2006	CS responded with no new information, but forwarded the message to colleagues
	USDA Forest Service Fort Pierre NG (Glen Moravek; gmoravek@fs.fed.us)	8-08-2006	No response
	USDA Forest Service Oglala NG (Jeff Abegglen; jsabegglen@fs.fed.us); Jason Brewer; jasonbrewer@fs.fed.us)	8-08-2006	JA responded with no new information, but forwarded the message to colleagues
	USDA Forest Service Cimarron NG (Andy Chappell; atchappell@fs.fed.us)	8-08-2006	<i>AC response summarized and on file</i>
	USDA Forest Service Pawnee NG (Beth Humphrey; bhumphrey@fs.fed.us)	8-08-2006	No response
	USDA Forest Service Comanche NG (Dave Augustine; daugustine@fs.fed.us)	8-08-2006	<i>DA response summarized and on file</i>
	USDI Bureau of Land Management Buffalo FO (Larry Gerard; larry_gerard@blm.gov)	8-08-2006	<i>LG response summarized and on file</i>
	USDI Bureau of Land Management Newcastle FO (Lynnda Jackson; lynnda_jackson@blm.gov)	8-08-2006	LJ responded with no new information, but forwarded the message to colleagues
	USDI Bureau of Land Casper FO (Jim Wright; jim_wright@blm.gov ; Sara Bucklin-Commiskey; Sarah_Bucklin-Comiskey@blm.gov)	8-08-2006	No response
	USDI Bureau of Land Management Rawlins FO (Frank Blomquist; frank_blomquist@blm.gov ; Mary Read; mary_read@blm.gov)	8-08-2006	<i>MR response summarized and on file</i>
	USDI Bureau of Land Management Lander FO (Sue Oberlie; sue_oberlie@blm.gov)	8-08-2006	<i>SO response summarized and on file</i>

Source Category	Source/ Name	Date	Results
	USDI Bureau of Land Management Cody FO (Dennis Saville; Dennis_Saville@blm.gov)	8-08-2006	No response
	USDI Bureau of Land Management Worland FO (Kim Stephens; kim_stephens@blm.gov ; Tom Ball; tom_ball@blm.gov)	8-08-2006	No response
	USDI Bureau of Land Management Royal Gorge FO (Eric Brekke; eric_brekke@blm.gov)	8-08-2006	No response
Primary experts	Fritz Knopf (USGS; Fritz_Knopf@usgs.gov)	8-08-2006	<i>FK response summarized and on file</i>
	Michael Wunder (Colorado State University; mbw@lamar.colostate.edu)	8-08-2006	<i>MW response summarized and on file</i>
Museums and Herbaria		--	No search conducted
Internal USFS Intranet search		--	No search conducted
Original Author	Stephen J. Dinsmore (Iowa State University; cootjr@iastate.edu)	--	<i>SD response summarized and on file</i>
(Other)		--	NA

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